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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/045,901	01/14/2002	Adam Divelbiss	VRex-0035USAAON00	1384

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EXAMINER	
CHANG, AUDREY Y	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 03/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

11-A

Office Action Summary	Application No.	Applicant(s)	
	10/045,901	DIVELBISS ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 22-33 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 22-33 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on **December 15, 2004** has been entered.

2. This Office Action is also in response to applicant's amendment filed on October 25, 2004, which has been entered into the file.

3. By this amendment, the applicant has amended claim 22.

4. Claims 22-33 remain pending in this application.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. **Claims 22-33 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 22 has been amended to include the phrase "switcher outputs a *synchronized* display frame", however the specification and the claims fail to teach how could a synchronized display frame, without specifying *the synchronization is between what*, be enable to provide stereoscopic image projection. The specification teaches *specifically* that an **Output Synchronization method,** which means

synchronization between the *processed* 3D image data (i.e. the input image data has to be formatted somehow) and the **switching** of the DMD display **must be** provided in order to have the switching rate independent of the rate of *input* data signal being received, (please see paragraph [0143]). It is not clear what is this "**synchronized** display frame". If this is simply the *display frame* for displaying the right eye and left eye perspective images then the specification fails to teach what is the synchronization needed for providing the stereoscopic image projection. In general, the right eye and left eye perspective images are **directed** to right and left eyes of the observer in a rate that is faster than the flicker rate of the eyes in order for the brain to process and to perceive it as stereoscopic illusion. The synchronization therefore has to be set up between the optics for directing the images to the right and left eyes respectively. Simply having a "synchronized display frame" will not enable stereoscopic image projection. Furthermore, if the switcher is to generate **synchronized** display frame then how could such synchronization being achieved **without** a sync-timing signal.

The specification and the claims further **fail** to teach how could the rate of the output synchronized display frame is *independent* of the rate of an input data frame comprising the left eye and right eye perspective images, presumably the output frame also comprise the left eye and right eye perspective images. Certain kind **of image formatting process** is essential but not provided in the claims to make the claims enable.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. **Claims 22-33 are rejected under 35 U.S.C. 112, second paragraph,** as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "internal color management system" recited in claim 22 is confusing and indefinite since it is not what is considered to be "color management system" and what is being managed here? It is also not clear how does this "color management system" *cooperate* with the rest of the system to make the image projection system a stereoscopic image projection system. *The scope concerning the "internal color management system" therefore is not clear.*

The phrase "3D stereoscopic projection system" is wrong and confusing. The term "3D" means three-dimensional, the term "stereoscopic" also means "three dimensional". This phrase should either be "3D *image* projection system" or "stereoscopic *image* projection system". Also it is the *image* being projected.

The phrase of "independent of *any* clock signal internal to said 3D stereoscopic projection" recited in claim 23 and the phrase "independent of *any* index signal internal to said 3D stereoscopic projection" recited in claim 24. It is not clear what are considered to be "any clock signal" and "any index signal" in these claims. The specification teaches that *in order* to achieve the "independence" of the switcher with respect to the input rate of the image data, the switcher *has to* be ***synchronized*** with the processed 3D image data, which is identified in the specification as "Output Synchronization" method, (please see the specification [0143]). If this is the case it is therefore not clear how could the switcher be "independent of any clock signal internal to the 3D stereoscopic projection system" or "any **index** signal internal to the 3D stereoscopic projection system", since some kind of clock or index signal within projection system, (i.e. internal to the projection system), must be there to ensure and control the synchronization. Therefore it is not clear **what** are then *these signals* and how are they related to the achieving of "Output Synchronization"? It is impossible for the switcher to provide "synchronized display frame" yet it is **independent** of any clock or index signal, with respect to what then does the "synchronization" is defined and generated?

The phrase "synchronized to a color wheel index signal for convenience" recited in claim 25 is confusing and indefinite since there **is no "color wheel"** being defined or claimed in the system.

The phrase "said decoupler" recited in claim 28 is confusing and indefinite since it lacks proper antecedent basis from it based claim.

The phrase "means for optically encoding a sequence of left-right images" recited in claim 29 is confusing and indefinite since it is not clear what is considered to be the "optical encoding".

Claim 30 is *completely confusing* since it is not clear what is the relationships between steps (a), (b) and (c). The scope of the claim is therefore unclear and indefinite. The applicant is respectfully reminded to *positively* state the relationships between the various "image" recited in the claim (30) and its based claims to make the scopes definite.

The phrase "said spatially multiplexed stereoscopic image data" recited in claims 32 and 33 is confusing and indefinite since it lacks proper antecedent basis from their respective based claim.

The applicant is respectfully noted that the various elements introduced in the various dependent claims fail to provide a logical and structural relationship with the elements in their respective based claims which therefore make the scopes of the claims very unclear and the examination of the claims become impossible.

The claims as stand now contain numerous errors, confusions and indefiniteness. It is applicant's responsibility to clarify ALL of the discrepancies in the claims to make them in comply with the requirements of 35 USC 112, first and second paragraphs.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 22-24, and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Sato et al (PN. 5,585,960) in view of the patent issued to Marshall et al (PN. 5,706,061).

The scopes of the claims are extremely unclear as stated in the claims, the claims therefor can only be examined in the broadest the interpretation.

Sato et al teach an apparatus to display *stereoscopic image,* which serves as the 3D stereoscopic projection system, wherein a *digital micro-mirror image display device* (DMD, 12, Figures 3 and 4) is used to display left and right eye perspective images in a flicker free fashion, an implicitly requirement for creating stereoscopic illusion, in a *time sequential and spatial sequential manner*, (please see Figure 24). Sato et al teaches that the apparatus or the 3D projection system comprises a mirror driving circuit and mirror wiring section for generating and supplying mirror control signals to *drive* the mirror sections of the DMD display device. The apparatus further comprises a *control section* for forming the data signal, mirror control signals and the control signals for the light source sections to enable the stereoscopic image projection. Sato et al teaches that the switching of the micro mirrors to display left and right perspective image is *synchronized* with respect to the *visual point regions*, that is to say the image frame displayed is a synchronized image frame and the mirror control signals are determined by the ***visual point region sync signal*** E0, (please see column 11, lines 30-35). It is implicitly true that the visual point region signals are ***position information*** bearing **sync signals** related to the ***processed*** 3D left eye and right eye perspective image data that are *formed by input signals*, (please note the forming of the image data for projection by the control section). It is implicitly true that the stereoscopic image projection is based on the **synchronization** between the ***visual point region information*** and ***switching*** of the digital micro-mirror image display device, which means that the rate at which image data received by

(or input into) the 3D projection system is *irrelevant* to the **projection** of the 3D image data. It is therefore either implicitly true that the switching of the DMD display device is *independent* of the rate of the image data being received, since the signal data is inputted and then *formed* by the *control section* into the image data signal to be displayed with *visual* point region synch signals as control or an obvious modification to one skilled in the art for the benefit of forming of the image data as taught by Sato et al to not rely on the input rate to reduce the projection image degradation caused by discontinuity of the input signal rate.

Claim 22 has been amended to include the features such that the digital micro-mirror display has an internal color management system. Sato et al does not teach such explicitly. However digital micro-mirror display includes an internal color wheel and lamp system for providing color display is very well known in the art as demonstrated by the teachings of **Marshall** et al, (please see Figure 1). It would have been obvious to one skilled in the art to modify the display system of Sato et al to include a color management system of Marshall et al for the benefit of providing full color display.

With regard to claim 23 and 24, Sato et al does not teach explicitly that the switching of the DMD display is independent of **any** clock signal or index signal internal to the projection apparatus. However this really **cannot** be the case, since in order for the stereoscopic image to be projected by the system certain kind of synchronization between the switching of the DMD display and the supplying of the image data has to be provided, even the specification of the instant application teaches about the Output Synchronization needed to be provided in order for the apparatus to be operable. It is therefore implicitly true the synchronization must be controlled by some kind of clock signal or index signal internal to the projection system and the switching of the DMD display cannot be independent of any clock signal and index signal.

With regard to claims 26-29, Sato et al teach that the left and right perspective images are in time and spatial sequential or multiplexed fashion since the left eye and right eye perspective images are

produced at different time sequence and at different spatial location. The image is also in column-multiplexed format, (please see Figure 24). Sato et al teaches that a *control section* is used to form the image data, or the left eye and right eye perspective image in the multiplexing manner. Also the synchronization between the switching of the DMD mirror and the visual point information of the multiplexed image data is controlled by the control section, which then in a way serves as the decoupler for decoupling the input image data rate and the switching of the right and left eye perspective images.

11. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Sato et al and Marshall et al as applied to claim 22 above, and further in view of the patent issued to Gove et al (PN. 5,528,317).

The apparatus for projecting stereoscopic image taught by **Sato** et al in combination with the teachings of **Marshall** et al as described for claim 22 above have met all the limitations of the claim. Sato et al reference however does not teach explicitly that the switching of the left and right perspective image is in synchronization with a color wheel signal. Marshall et al teaches that the color wheel on the color management system is synchronized with the **lamp** and the **video source** for the digital micro-mirror display. **Gove** et al in the same field of endeavor further teaches a method and apparatus of synchronizing the display timing of a digital micro mirror display system **with a color wheel**, (please see column 5 and Figures 1-5), such that the display timing becomes independent of the timing of the input video timing. It would then have been obvious to one skilled in the art to apply the explicit teachings of Gove et al to modify the projection system of Sato et al in view of Marshall et al for the benefit of minimizing the discontinuity in input video signal timing on the display.

12. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al and Marshall et al as applied to claim 22 above, and further in view of the patent issued to Lazzaro et al (PN.6, 456,432).

The apparatus for projecting stereoscopic image taught by **Sato** et al in view of the teachings of **Marshall** et al as described for claim 22 above have met all the limitations of the claims. Sato et al teach that the left and right perspective image is displayed in column-multiplexed format and in time sequential manner however it does not teach explicitly about the *data conversion methods* as claimed in the claims. *Claim 30 is extremely confusing and it is not clear what kind of data conversion is really claimed.* It can only be examined in the broadest sense. **Lazzaro** et al in the same field of endeavor teaches a stereoscopic image viewing system wherein a data conversion method is used to display the time multiplexed image stream by converting the *spatially interlaced image data* into *time multiplexed image streams*, (please see column 11, and Figure 3). It would then have been obvious to one skilled in the art to apply the teachings of Lazzaro et al to actually carry out the conversion of data into desired time multiplexed format for displaying it.

13. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Sato et al and Marshall et al as applied to claim 22 above, and further in view of the patent issued to Lazzaro et al and Martinez et al (PN. 5,226,114).

The apparatus for projecting stereoscopic image taught by **Sato** et al in combination with the teachings of **Marshall** et al as described for claim 22 above have met all the limitations of the claims. This reference however does not teach explicitly that a column blanking method and column doubling method is used in the claimed conversion method. **Lazzaro** et al in the same field of endeavor teaches a stereoscopic image viewing system wherein a data conversion method is used to display the time multiplexed image stream by converting the spatially interlaced image data into time multiplexed image

streams, (please see column 11, and Figure 3). It would then have been obvious to one skilled in the art to apply the teachings of Lazzaro et al to actually carry out the conversion of data to desired time multiplexed format for displaying it. These references however do not teach about the column blanking or column doubling method. **Martinez** et al in the same field of endeavor teaches that it is well known in the art to use *column-doubling method* in displaying the image to improve image resolution, (please see column 1). It would then have been obvious to one skilled in the art to modify the display apparatus for the benefit of improving the image resolution. Similarly, it would have been obvious to one skilled in the art to modify the display apparatus of Sato et al to use column-blanking method to improve the resolution and quality of image display for such method is also well known in the art.

Response to Arguments

14. Applicant's arguments with respect to claims 22-33 have been considered but are moot in view of the new ground(s) of rejection.

15. In response to applicant's arguments which stated that the cited references teach to use a synchronization signal to generated the output display image frame which therefore does not teach a stereoscopic image projection system such that the switching between the left and right eye images is independent of the input data rate, the examiner respectfully disagrees for the reasons stated below. The output image frame that provides (or switching between) left and right eye perspective images has to be **synchronized** with respect to the receiving timing and brain processing rate of the observer in order for the image to be perceived as stereoscopic image. In order to achieve such synchronization **some sort** of the timing or sync timing signal must exist otherwise the synchronization cannot occur or cannot be established. Secondly, the cited references Sato, Marshall and Gove all teach to make **synchronization** between the *output image frame* and either visual point region or color wheel which is *independent* of the input rate of the image data. It is implicitly true that the visual point region is independent of the **rate** of

the image data being inputting in the projection system. The color wheel in synchronized with the lamp could be independent of the input data rate, since it is controlled by the lamp-switching rate and the motor rate for rotating the color wheel.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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